

## **ITEM FOR FINANCE COMMITTEE**

### **HEAD 44 – ENVIRONMENTAL PROTECTION DEPARTMENT**

#### **Subhead 700 General non-recurrent**

#### **New Item “Trial of Electric Buses by Franchised Bus Companies”**

Members are invited to approve the creation of a new commitment of \$180 million for funding the full cost of procuring 36 electric buses and related charging facilities for trial by the franchised bus companies in Hong Kong.

### **PROBLEM**

Franchised buses are one of the major sources of roadside air pollution at busy corridors. We need to implement new measures to reduce emissions from franchised buses.

### **PROPOSAL**

2. The Director of Environmental Protection, with the support of the Secretary for the Environment, proposes to create a new commitment of \$180 million to fund the full cost of procuring 36 single-deck electric buses (including 28 battery-electric buses and eight supercapacitor buses) and related charging facilities. They are to be used by the five franchised bus companies for a trial run on different routes to assess the vehicles' operational efficiency, performance and economic feasibility in local conditions.

3. Subject to the funding approval by this Committee, we plan to work with the five franchised bus companies to procure 36 electric buses in this year. Allowing one year for delivery, the trial is expected to commence in early 2014.

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## JUSTIFICATION

### Need for Improvement of Roadside Air Quality

4. Electric buses do not have tailpipe emissions. Replacing conventional franchised buses with electric buses can substantially improve roadside air quality, particularly along busy corridors. It is the Government's ultimate policy objective to have zero emission buses running across the territory. Besides, it is a world-wide trend to try out electric buses in public transport as a green initiative. The Chief Executive proposed in his Policy Address last October to earmark \$180 million for franchised bus companies to purchase 36 electric buses for trial runs.

5. If the results of the proposed trial are satisfactory, the Government will encourage franchised bus companies in a suitable way to use electric buses on a larger scale. In this regard, additional requirements have already been included in the three bus franchises<sup>Note</sup> newly granted in April 2012 so that the bus companies concerned have to acquire the most environment-friendly buses that are technologically proven and commercially available when procuring new buses in future, taking into account affordability of the companies and passengers. Similar requirements will be imposed on the three remaining bus franchises upon their expiry in 2016 and 2017.

### The Electric Bus Technology

6. The electric buses now available on the market are single-deckers. They are used in Mainland and overseas cities such as Shanghai, Shenzhen, Beijing and Seoul. Two main types of electric buses are being used in public transport, namely, supercapacitor buses which use supercapacitors as the energy storage devices, and battery-electric buses which are purely operated by batteries. A fully-charged battery-electric bus can travel a distance of about 200 kilometres while a full charging will normally take three to four hours, depending on the design of their charging systems. It is also feasible to top up the battery level through charging about one to two hours when the bus returns to depot. On the other hand, supercapacitor buses can sustain a travelling distance of about seven to ten kilometres and can be fully charged in a few minutes. They are more suitable for routes with a short distance, but charging facilities will need to be provided at bus stops and/or termini for top-up charging.

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<sup>Note</sup> The five franchised bus companies are operating six franchises.

7. Unlike the public buses in other cities, the operational mode of franchised buses in Hong Kong is much more intensive, characterised by high operation frequency, long service hours, high peak capacity requirement, hilly terrains, as well as hot and humid summer that requires intense air-conditioning capability. These stringent operational conditions will put electric buses, particularly their batteries and supercapacitors, to a very severe test. Hence, a trial run for electric buses is essential for Hong Kong before considering a wider application.

### **The Proposed Trial**

8. Having consulted the five franchised bus companies and taking into account their fleet size, service areas and technology preference, we propose the following distribution for the 36 electric buses –

- (a) The Kowloon Motor Bus Company (1933) Limited – eight supercapacitor buses for testing on two routes, and ten battery-electric buses on five routes;
- (b) Citybus Limited/New World First Bus Services Limited – ten battery-electric buses for testing on five routes;
- (c) Long Win Bus Company Limited – four battery-electric buses for testing on two routes; and
- (d) New Lantao Bus Company (1973) Limited – four battery-electric buses for testing on two routes.

9. In order to provide a more comprehensive assessment on the new technology, we will require each franchised bus company to acquire electric buses from at least two bus suppliers whenever practicable.

10. The franchised bus companies will be required to operate the electric buses along routes covering different operating characteristics so as to fully assess their capabilities. The bus routes for the trial run will include highways and connections within urban areas and new towns (with frequent starts and stops), and those covering different road gradients, route lengths, and passenger loadings as far as practicable.

11. The franchised bus companies will be responsible for the recurrent costs arising from operating these buses and the related charging facilities. Given that the Government will fund the full cost of procurement and that the number of electric buses involved is small compared with the overall fleet size of the franchised bus, we do not expect the trial run to have any implication on the bus fares.

12. The trial will last for two years in order to fully assess the operational efficiency and performance of the electric buses under local conditions. A mid-term review will be carried out one year after the commencement of the trial to provide a preliminary assessment of the performance of the electric buses. The franchised bus companies will be required to continue to deploy the electric buses for providing franchised bus service until the end of the economical service life of the vehicles concerned.

13. To expedite preparation for the trial, we have already commenced discussion with the franchised bus companies on the details of the trial arrangements. Allowing time for the tendering and the delivery of the buses, we envisage that the trial could commence in early 2014.

14. To monitor the trial, we will set up a task force, comprising representatives from the franchised bus companies and relevant government departments, including the Transport Department (TD) and Environmental Protection Department (EPD)

## **FINANCIAL IMPLICATIONS**

15. The electric buses now available on the market are single-deckers. Based on the information provided by potential electric bus suppliers and the franchised bus companies, we estimate that the total cost for 36 single-deck electric buses (including 28 battery-electric buses and eight supercapacitor buses) and related charging facilities (including installation cost) is about \$180 million.

16. Therefore, we propose to create a new commitment of \$180 million for the proposed trial. Procurement of the electric buses and related charging facilities by the bus companies with Government's full funding support will be made in 2012-13 and it is estimated that a 10% deposit (about \$18 million) will be required. The electric buses are expected to be delivered in around a year's time and the balance (about \$162 million) will be paid in 2013-14. The actual cash flow will depend on the tendering results and exchange rate fluctuations. For planning and budgetary purpose, the estimated cash flow is as follows –

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<b>Financial year</b>	<b>(\$ million)</b>
2012 – 13	18
2013 – 14	162
<b>Total</b>	<b>180</b>

17. Additional staff resources have been allocated to EPD and TD to oversee the trial, monitor the setting up of the charging facilities, evaluate the environmental performance of the electric buses and the trial results, and work with the franchised bus companies and bus manufacturers to take forward the trial. The additional manpower resources will be reflected in the Estimates of the relevant years.

## **PUBLIC CONSULTATION**

18. We consulted the Legislative Council Panel on Environmental Affairs (the Panel) on 28 May 2012. The Panel agreed for us to seek funding approval from this Committee. Some members were concerned on whether the franchised bus companies would be required to use electric buses on a wider scale after the trial. Upon the request of members, we have provided the following supplementary information on 1 and 11 June 2012 for their reference –

- (a) requirements on replacement of buses with the most environment-friendly models in the three bus franchises newly granted in April 2012;
- (b) the replacement programme for franchised buses in the next few years; and
- (c) proposed key terms to be included in the agreement with the franchised bus companies on the trial of electric buses.

## **BACKGROUND**

19. To improve roadside air quality, we have been pursuing a combination of measures as follows –

- (a) introduce cleaner alternatives to diesel vehicles where practicable;
- (b) adopt the most stringent vehicle emission and fuel standards where practicable;

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- (c) provide a one-off grant to encourage commercial vehicle owners to replace their old vehicles with new ones complying with the prevailing emission requirements;
- (d) provide tax incentives to encourage the use of environment-friendly vehicles;
- (e) mandate pre-Euro diesel vehicles to be equipped with emission reduction devices;
- (f) ensure proper maintenance of in-use vehicles through a combination of voluntary and regulatory measures;
- (g) strengthen the emission control on petrol and liquid petroleum gas (LPG) vehicles and provide a one-off subsidy to assist petrol and LPG taxi and light bus owners to replace the catalytic converters and oxygen sensors of their vehicles;
- (h) set up a \$300 million Pilot Green Transport Fund to support the testing of green and innovative technologies applicable to the public transport sector and goods vehicles;
- (i) implement the Motor Vehicle Idling (Fixed Penalty) Ordinance against idling vehicles with running engines;
- (j) conduct a trial to retrofit Euro II and Euro III franchised buses with selective catalytic reduction devices to reduce nitrogen oxides emissions;
- (k) encourage franchised bus companies to deploy more environment-friendly buses to serve the busy corridors;
- (l) plan to implement pilot low emission zones for franchised buses along the busy corridors in Causeway Bay, Central and Mong Kok; and
- (m) fund the full cost of procuring six hybrid buses for trial by the franchised bus companies along the busy corridors.

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